

## **FUNDAMENTAL OF NURSING I**

### **TOPIC: MEETING CLIENT'S COMFORT**

#### **SUB TOPIC: BODY MECHANIC**

#### **DEFINITION**

Good body mechanic is the efficient, coordinated, and safe use of the body to produce motion and maintain balance during activity. Good body mechanics is essential to both patient and nurses to prevent strain, injury and fatigue. Purposes of proper body mechanic:

1. Facilitate safe and efficient use of appropriate groups of muscles.
2. Promotes body musculoskeletal functioning.
3. Reduce the energy required to move and maintain balance.

#### **FOUR BASIC ELEMENTS OF BODY MECHANIC**

##### **1. Body alignment and posture**

Body alignment refers to the geometric arrangement of various body parts in relation to each other. It is the line of gravity passes through the center of gravity and the base of gravity. A person's posture is one criterion for assessing general health, physical fitness, and attractiveness. Posture reflects the mood, self-esteem, and personality of an individual.

Advantages of proper body alignment:

1. Good alignment promotes optimal balance and maximal body function in whatever position the patient assumes (standing, sitting, lying down). When the body is well aligned, balance is achieved without undue strain on the joints, muscle, tendons or ligaments. Skeletal muscles are usually in a state of slight tension or contraction (tonus) when the body is healthy and well aligned.
2. Enhances lung expansion and promotes efficient circulatory, renal and gastrointestinal function.

Disadvantage of poor body alignment:

1. Detracts from a body pleasing appearance.
2. Affects an individual's health.

## 2. Joint mobility

Joints are the functional units of the musculoskeletal system. The bones of the skeletal articulate at the joint.

Types of joint movement:

| <b>Movement</b> | <b>Action</b>   |
|-----------------|---|
| Flexion         | Decreasing the angle of the joint (e.g. bending the elbow).   |
| Extension       | Increasing the angle of the joint (e.g. straightening the arm).   |
| Hyperextension  | Further extension or straightening of a joint (e.g. bending the head backward).                             |
| Abduction       | Movement of the bone away from the midline of the body.   |
| Adduction       | Movement of the bone toward to midline of the body.   |
| Rotation        | Movement of the bone around the central axis (e.g. turn face as far as possible to the right and left).     |
| Circumduction   | Movement of the distal part in a circle while the proximal end remains fixed.                               |
| Eversion        | Turning the sole of the foot outward by moving the ankle joint.   |
| Inversion       | Turning the sole of the foot inward by moving the ankle joint.  |
| Pronation       | Moving the bones of the forearm so that the palm of the hand faces downward when held in front of the body. |
| Supination      | Moving the bones of the forearm so that the palm of the hand faces upward when held in front the body.      |

## 3. Balance

Balance is a state of equilibrium in which opposing forces counteract each other. Good alignment is essential to body balance. A person maintains balance as long as the line of gravity (an imaginary vertical line drawn through an object's center of gravity) passes through the center of gravity (point at which all of the mass of an object is centered) and the base of support (the foundation on which an object rests).

The center of gravity of a well-aligned standing adult is located slightly anterior to the upper part of the sacrum. Standing posture can be unstable because of a narrow base of support, a high center of gravity and a constantly shifting line of gravity. For greatest balance and stability, a standing adult must center body weight symmetrically along the line of gravity.

Balance depends on the interrelationship of the center of gravity, the line of gravity, and the base of support. In a well aligned standing person, the centre of gravity remains fairly stable. When the person move, the center of gravity shifts continuously in the direction of the moving body parts. The closer the line of gravity is to the center of the base of support, the greater the person's stability. Conversely, the closer the line of gravity is to the edge of the support, the precarious the balance. If the line of gravity falls outside the base of support, the person falls.

#### **4. Coordinated body movement**

Balance, smooth, purposeful movement is the result of proper functioning of the cerebral cortex, cerebellum, and basal ganglia.

1. The cerebral cortex initiates voluntary motor activity.
2. The cerebellum coordinates the motor activities of movement.
3. The basal ganglia maintain posture.

### **LIFTING**

When a person lifts / carries an object, the weight of the object becomes part of the person's body weight. This weight affects the location of the centre of gravity, which is displaced in the direction of the added weight. To counteract this potential imbalance, body parts move in a direction away from the weight. In this way, the centre of gravity is maintained over the same point in the base of support.

When lifting an object from the floor, move close to the object and flex back and knees to grasp the object. Lift the object to knee level by keeping the back flexed while the knees begin to straighten so that the leg muscle can exert an upward thrust. Keep the back and knees in a less flexed but not straight.

Because lifting involves movement against gravity, the nurse must use major muscle groups of the thighs, knees, upper and lower arms, abdomen and pelvis to prevent back strain. The nurse can increase overall muscle strength by synchronized use of as many muscle groups as possible during an activity.

## PULLING AND PUSHING

When pulling / pushing an object, nurse maintain balance with least effort when the base of support is enlarge in the direction in which the movement is to be produce or opposed. When pushing an object, nurse can enlarge the base of support by moving the front foot forward. When pulling an object, move the rear leg back if facing the object or move the front foot forward if facing away from the object.

## PIVOTING

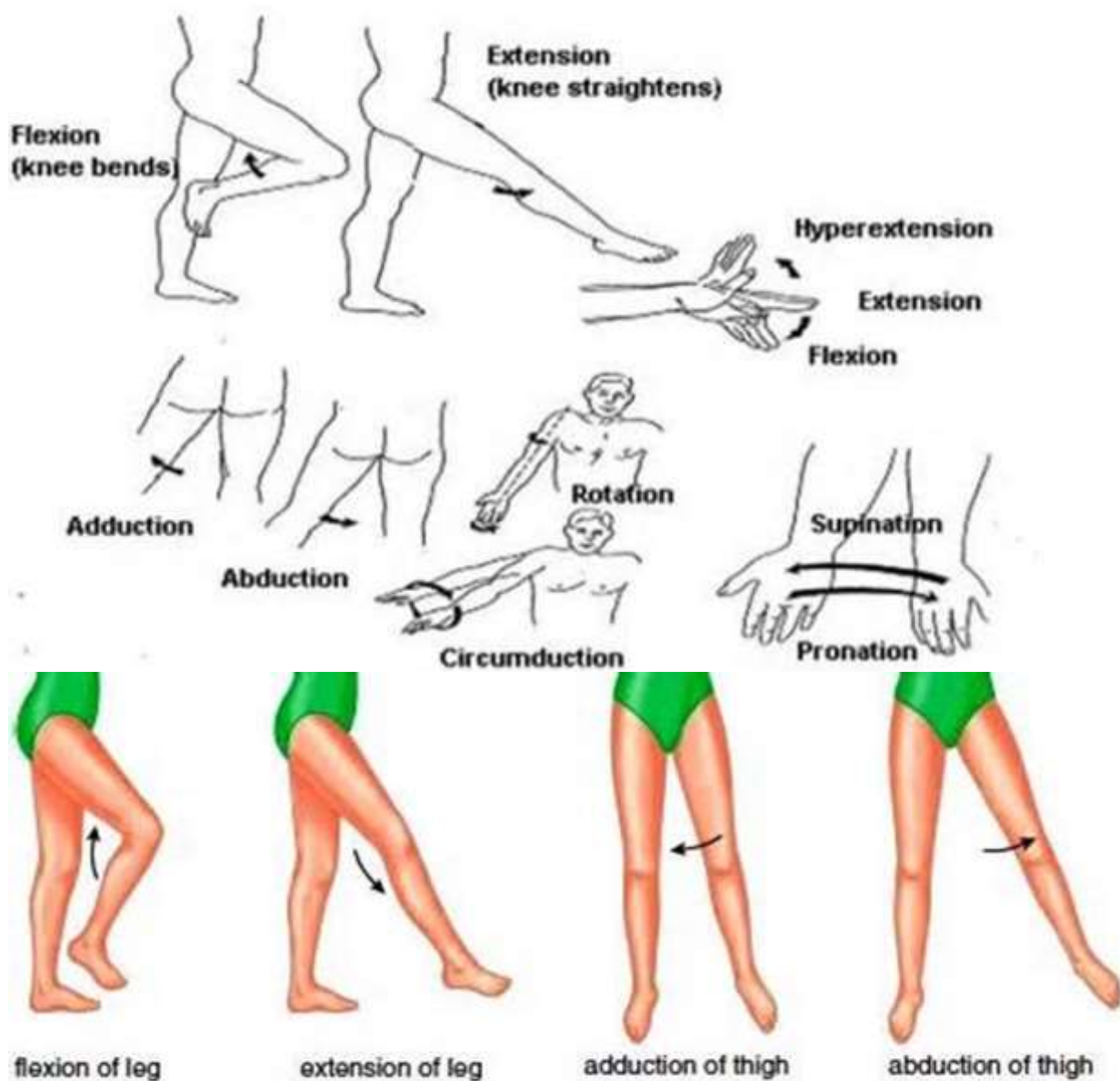
Pivoting is a technique in which the body is turn in a way that avoids twisting of the spine. Nurse should not twist when turning or lifting patient. Move and change direction with the feet. Nurse should turn by pivoting their feet, not their trunk. To pivot, place 1 foot slightly ahead of the other. Raise both ankles and heels slightly and put the body weight on the balls of the feet. Turn both feet 90° at the same time while keeping the body aligned.

## PRINCIPLES OF BODY MECHANIC

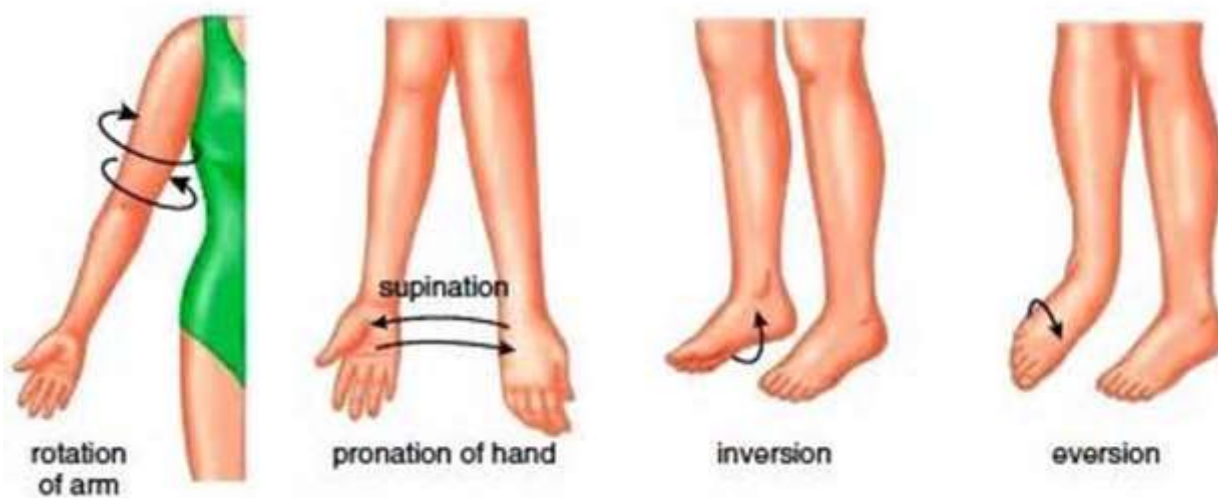
| Principles  | Rational   |
|---|--|
| 1. Arrange for adequate help, use mechanical devices if help is unavailable or encourage patient to assist as much as possible. | Promotes patient's abilities and strenght while minimized workload.                  |
| 2. Keep back, neck, pelvis and feet aligned.  | Avoid twisting as it increases risk of injury.                                       |
| 3. Flex knees, keep feet wide apart.  | A broad base of support increases stability.   |
| 4. Position self close to patient (or object being lifted).   | The force is minimized.  |
| 5. Use arms and legs muscles (not back).  | The leg muscles are stronger, larger muscles capable of greater work without injury. |
| 6. Face the direction of the movement.  | Prevent unnecessary twisting.  |

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| 7. Push, slide, or pull heavy object. Use pullsheets to slide patient.   | Places less strain on body than lifting does. Pull sheet minimize shearing forces. |
| 8. Tighten or contract abdominal and gluteal muscle in preparation for move.   | To support the joint and prevent injury to muscle.                                 |
| 9. When pushing an object, move the front foot forward. When pulling an object, move the rear leg back if facing the object or move the front foot forward if facing away from the object. | To enlarge the base of support.  |
| 10. Lift twice – once mentally and then physically.  | Determines if assistance is need.  |
| 11. Do not lift object higher than chest level. Do not reach above your shoulders.   | Much safer to use a step stool to reach an object higher than chest level.         |
| 12. Lower the head of the bed before moving patient up toward the head of the bed.   | To free the surrounding area and allow space for patient to move up.               |





a. Angular movements



b. Circular movements

c. Special movements